KSH 213 Wildlife Ex-Situ Conservation

Credit	:	2(2-0)
Semester	:	4 (even)
Course format	:	Lectures, individual and group assignments. 14 weeks
Pre-requisite	:	**-**
Lecturer	:	Dr. Machmud Thohari, DEA.

Course Description

This course describes the following topics:

1. Introduction will provide meanings, limitation and scope of wildlife ex-situ conservation
2. Maintenance of fauna genetic diversity and their management
3. Population status and vulnerability: minimum viable population size, genetic considerations
4. Differentiation between species and population structure within population viability: population viability method, species distinction and PVA
5. Molecular genetic of endangered species: definition of species and sub species, preservation or interbred, application of molecular genetic technique
6. Reintroduction: role of habitat restoration, introduction to conservation
7. Ex-situ conservation method: frozen preservation (kryopreservatin), genomic libraries
8. Measurement and utilization of genetic diversity: selection, migration, mutation, *genetic drift*.

Course Objective

The objective of this course is to provide students with knowledge on wildlife ex-situ conservation and the ability to analyze and solve problems with technology so that they are able to implement the knowledge and wildlife ex-situ conservation technology wfor wildlife preservation and utilization.

Learning Outcomes

1. **General learning outcomes**

   Upon successful completion of this course the students will be able to:

Correctly explain wildlife ex-situ conservation, its scope, analysis, method and management.

2. Specific learning outcomes

Upon successful completion of this course the students will be able to:

a. Explain the background, objectives, scope and linkages between various disciplines on wildlife conservation science, and reasons for its significance
b. Understand the science of wildlife ex-situ conservation and its implementation technology
c. Understand and able to implement wildlife ex-situ conservation programme to support wildlife in-situ conservation programme
d. Understand ex-situ conservation technology within the context of wildlife biodiversity preservation.

Structure of Course Delivery

1. Lectures.
2. Course practice.
3. Individual and group assignments.

Major References

1. Auffenberg, W. 1981. The Behavioral Ecology of the Komodo Monitor. Univ. Presses of Florida. Gainesville.
2. Anonim. 1993. Managing Global Genetic Resources: Livestock. Committee on Managing Global Resources: Agricultural Imperatives. Board on Agriculture, Nat. Res. Council. Nat. Acad. Press. Washington D.C.
3. Bailey, J.A. 1984. Principle of Wildlife Management. John Wiley & Sons. New York. Pp. 142-194.
4. Cook, L.M. 1991. Genetic and Ecological Diversity: the sport of nature. Chapman & Hall. London. Pp. 19-20.
5. FAO. 1998. User's Manual for National Coordinators for the Management of Farm Animal Genetic Resources.
6. KMNLH. 1994. Keanekaragaman Hayati di Indonesia. Jakarta.
7. Olney, P.J.S., G.M. Mace and A.T.C. Feistner. 1994. Creative Conservation: Interactive management of wild and captive animals. Chapman & Hall. London. Pp. 144-162; 167-175; 178-198; 243-262; 265-284; 287-300; 304-310; 321-323;

329-335; 338-350; 352-363; 365-381; 420-429; 467-476; 478-484; 486-494; 495-503.

8. Primack, R.B., 1993. Essentials of Conservation Biology. Sinauer Assoc. Inc. Publ. Sunderland, Massachusetts, USA. Pp. 170-174; 175; 201; 203-211; 370-374; 378-390; 405-451; 438-451.
9. Price, M.K.S. 1989. Animal Re-introductions: the Arabian Oryx in Oman. Cambridge Univ. Press. Cambridge.

Teaching Material Support

The choice of media and type of technology use include:

1. Face-to-face contact.
2. Printed power point presentation.
3. Computer.
4. Projector Infocus.
5. Whiteboard.

Course Outline

Topics	Sub-topics	Bloom's Taxonomy	Week
Introduction	Meaning and scope of wildlife ex-situ conservation	C1	1
Maintenance of fauna genetic diversity and their management	1. Basic ex-situ conservation theories 2. Wildlife genetic diversity 3. Wildlife ex-situ management	C1, C2	2
Population status and vulnerability	1. Meaning of wildlife population vulnerability 2. Genetic variation 3. Minimum viable population size 4. Genetic considerations	C1	3
Differentiation between species and population structure within population viability	1. Population viability methods 2. Distinction between species and PVA	C1, C2	4 & 5
Molecular genetic of endangered species	1. Meaning, definition of species and sub species 2. Preservation problems or interbred 3. Application of molecular genetic technique	C1, C2, C3	6 & 7
Reintroduction	1. Reintroduction mechanism 2. Habitat restoration 3. Introduction to conservation	C1, C2	8, 9 & 10
Ex-situ conservation method	1. Meaning of ex-situ conservation method 2. Frozen preservation 3. Genomic libraries	C1, C2	11 & 12

Topics	Sub-topics	Bloom's Taxonomy	Week
Measurement and utilization of genetic diversity	1. Meaning of measurement and utilization of genetic diversity 2. Selection 3. Mutation 4. Genetic drift	C1, C2	13 & 14

Potential Course Overlap

There will be some deliberate overlap topics with other courses, such as Wildlife Captive Breeding (KSH315), Management of Wildlife Feed and Health (KSH316).

Evaluation and Grading

1. **Midterm examination**

   Midterm examination will be given during examination period (after 7 weeks course). Each examination is composed of 100% essay and taking time 90-120 minutes. The examination covers course material which is delivered to the student during previous 7 weeks. A key and score will be attached on announcement board after exam paper is graded.

2. **Final examination**

   Final examination will be done in the end the semester period.. Each exam is composed of essay and Multiple Choice as well as Pair question and taking time 90-120 minutes. The exam will cover course material which is delivered to the student during previous 14 weeks. A key and score will be attached on announcement board after exam paper is graded.

3. **Course Practice Reports**

   Each student is obliged to submit some practice reports. This assigned reports are objected to help students understand as good as possible the real problem of the wildlife ex-situ conservation at local, national, as well as at global level. This practical assignment is also aimed to stimulate what the student think about the relation between lecture material and field application. The due date of reports submission is one week after practical during lecture/practice period. The reports are graded based on formulas and calculation format.

Compositions of grading are as follows:

Assessment Tools	Maximum Score	% of Grade
Midterm Examination	100	30
Final Examination	100	40
Course Practice Reports	100	30

Final grade classification: A (≥77,5); B (67,5-77,4); C (55-67,4); D (45-54); E (<45)

Coverage of DFORCE Core Competence
in Wildlife Ex-Situ Conservation (KSH 213)

Code : KSH 213

Course : Wildlife Ex-Situ Conservation

Credit : 2(2-0)

Code	Core Competencies	Course Content Covered	Cognitive Level	Topic
I	Students will be able to understand the meaning and scope of wildlife ex-situ conservation	Meaning and scope of wildlife ex-situ conservation	C1	Introduction
II	Students will be able to understand the basic wildlife genetic diversity and their ex-situ management conservation theories	Basic ex-situ conservation theories	C1, C2	Maintenance of wildlife genetic diversity and their management
		Wildlife genetic diversity		
		Wildlife ex-situ management		
III	Students will be able to understand the phenomenon that explain wildlife population vulnerability mechanism, minimum viable population size, genetic consideration	Meaning of wildlife population vulnerability	C1	Population status and vulnerability
		Genetic variation		
		Minimum viable population size		
		Genetic considerations		
IV	Students will be able to understand population viability methods, distinction between species and PVA	Population viability methods	C1, C2	Differentiation between species and population structure within population viability
		Distinction between species and PVA		
V	Students will be able to understand definition of species and sub species, preservation problems and application of molecular genetic technique	Meaning, definition of species and sub species	C1, C2, C3	Molecular genetic of endangered species
		Preservation problems or interbred		
		Application of molecular genetic technique		

Code	Core Competencies	Course Content Covered	Cognitive Level	Topic
VI	Students will be able to understand the meaning and mechanism of reintroduction, habitat restoration, introduction to conservation	Reintroduction mechanism	C1, C2	Reintroduction
		Habitat restoration		
		Introduction to conservation		
VII	Students will be able to understand ex-situ conservation methods, including frozen preservation and genomic libraries	Meaning of ex-situ conservation method	C1, C2	Ex-situ conservation method
		Frozen preservation		
		Genomic libraries		
VIII	Students will be able to understand selection, migration, mutation and genetic drift.	Meaning of measurement and utilization of genetic diversity	C1, C2	Measurement and utilization of genetic diversity
		Selection		
		Mutation		
		Genetic drift		

Assessment Tools to Measure the Achievement of
Learning Outcomes in Wildlife Ex-Situ Conservation (KSH 213)

Code : KSH 213

Course : Wildlife Ex-Situ Conservation

Credit : 2(2-0)

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
I	Students will be able to understand the meaning and scope of wildlife ex-situ conservation	Students will be able to explain the meaning and scope of wildlife ex-situ conservation	C1	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
II	Students will be able to understand the basic wildlife genetic diversity and their ex-situ management conservation theories	Students will be able to explain the basic wildlife genetic diversity and their ex-situ management conservation theories	C1, C2	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
III	Students will be able to understand the phenomenon that explain wildlife population vulnerability mechanism, minimum viable population size, genetic consideration	Students will be able to explain the phenomenon that explain wildlife population vulnerability mechanism, minimum viable population size, genetic consideration	C1	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
IV	Students will be able to understand population viability methods, distinction between species and PVA	Students will be able to explain population viability methods, distinction between species and PVA	C1, C2	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
V	Students will be able to understand definition of	Students will be able to explain definition of	C1, C2, C3	Written examinations at different cognitive level	Classroom lecture and discussion

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
	species and sub species, preservation problems and application of molecular genetic technique	species and sub species, preservation problems and application of molecular genetic technique		(mid-term exam).	
VI	Students will be able to understand the meaning and mechanism of reintroduction, habitat restoration, introduction to conservation	Students will be able to explain the meaning and mechanism of reintroduction, habitat restoration, introduction to conservation	C1, C2	Written examinations at different cognitive level (final exam).	Classroom lecture and discussion
VII	Students will be able to understand ex-situ conservation methods, including frozen preservation and genomic libraries	Students will be able to explain ex-situ conservation methods, including frozen preservation and genomic libraries	C1, C2	Written examinations at different cognitive level (final exam).	Classroom lecture and discussion
VIII	Students will be able to understand selection, migration, mutation and genetic drift.	Students will be able to explain selection, migration, mutation and genetic drift.	C1, C2	Written examinations at different cognitive level (final exam).	Classroom lecture and discussion

KSH 222 Conservation Planning

Credit	:	2(2-0)
Semester	:	4 (even)
Course format	:	Classroom lectures, individual assignment, group assignment. 100 minutes per week. 16 weeks
Pre-requisite	:	**-**
Lecturers	:	Ir. Haryanto R. Putro, MS. (Course coordinator) Dr. Harnios Arief, MScF

Course Description

This course describes protected area planning based on holistic approach and accommodates various importance, including ecological, social and economic. This course provides information on theories, concepts and techniques of protected area planning based on spatial scale approach (bioregional/eco-regional and local).

Course Objectives

This course is design to provide students with understandings of theories, concepts and techniques of protected area planning based on spatial scale approach (bioregional/eco-regional and local).

Learning Outcomes

1. **General learning outcomes**

   Upon successful completion of this course the students will be able to:

   a. Explain the principles, objectives and instruments in protected area planning
   b. Design protected area planning in regional and local scales based on holistic approaches
   c. Explain the linkages between ecological, social, cultural and economical values of protected area in protected area planning and regional development.

Structure of Course Delivery

1. Lectures.
2. Individual and group assignments.

Major References

1. Ayala, F.J. and J.W. Valentine. 1979. Evolving: the Theory and Processes of Organic Evolution. The Benyamin/Cummings Publ. Co.,Inc. London.
2. Avers, Ch.J. 1974. Evolution. Harper & Row Publ. London.
3. Borrini-Feyerabend, M.G., T. Farvar, J.C. Nguinguiri and V.A. Ndangang. 2000. Co-management of Natural Resources: Organising, Negotiating and Learning-by-Doing. IUCN-GTZ.
4. Brown, L.R. 2000. *Eco-Economy: Building an Economy for the Earth.* W. W. Norton & Co., New Yok.
5. Eghenter, C., Sellato, B., and Devung, G.S. 2003. Social Science Research and Conservation Management in the Interior of Borneo: Unravelling Past and Present Interactions of People and Forests. CIFOR, WWF Indonesia, UNESCO and Ford Foundation
6. Groenendijk, L. 2003. Planning and Management Tools. ITC, Enschede. Netherland.
7. Hengeveld, R. 1990. Dynamic Biogeography. Cambridge Univ. Press.
8. Kartawinata, K. dan Whitten, A.J. 1991. Krisis Biologi: Hilangnya Keanekaragaman Hayati. Yayasan obor Indonesia. Jakarta.
9. Mrran, A.E. 1983. Ecological Diversity and Its Measurement. Croom Helm. London. Sydney.
10. McNeely, J.A., 1988. Economics and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resource. IUCN, Gland, Switzerland.
11. McNeely, J.A., Miller, K. ReiD, W. Mittermeier, R. Werner, T. 1990. Conserving the World's Biological Diversity. World Bank, WRI, IUCN, Conservation International, WWF.
12. MacKinnon, J., MacKinnon, K., Child, G., dan Thorsell, J. 1990. Pengelolaan Kawasan Dilindungi di Daerah Tropik (*Terjemahan*). Gadjah Mada University Press.
13. Meffe, G.K. and Carroll C.R. 1994. Principles of Conservation Biology. Sinauer Associates, Inc. Sunderland, Massachussets.
14. Shafer, C.L., 1990. Island Theory and Conservation Practice. Smithsonian Institution Press. Washington and London.
15. Soule, M.E. (*Ed.*), 1987. Viable Population for Conservation. Cambridge University Press. Cambridge.

16. Wollenberg, E., Edmunds, D. dan Buck, L.. 2001. Mengantisipasi Perubahan Skenario: Sebagai Sarana Pengelolaan Hutan Secara Adaptif. CIFOR

Teaching Material Support

The choice of media and type of technology use include:

1. Face-to-face contact.
2. Printed power point presentation.
3. Computer
4. Projector Infocus
5. Whiteboard

Course Outline

Topics	Sub-topics	Bloom's Taxonomy	Week
Introduction	1. Definition and scope 2. Importance of protected area planning	C1	1
Policy studies	1. National development planning system 2. Regional planning 3. Forestry planning system	C1	2
Theoretical bases & conceptual framework for protected area planning	1. Bioregional/eco-regional approach 2. Island biogeography theory 3. Species evolution and formation 4. Traditional wisdom, tenurial and community access to natural resources 5. Protected area management policies 6. Common-Pool Resources 7. Position of protected area in regional development 8. Protected area management institution including governance	C1, C2	3 - 4
Benefits of protected area in regional development	1. Ecological benefits of protected areas 2. Social cultural benefits of protected areas 3. Economical benefits of protected areas	C1, C2	5 & 6
Planning tools for protected area	1. Problem and objective analysis 2. Logical framework approach 3. SWOT analysis 4. Stakeholders Analysis 5. Interviews 6. Workshops and Focus Group Discussion 7. Need Assessment 8. Cost-Benefit Analysis	C2, C3	7 - 10
Allocation and establishment of protected areas	1. Criteria for protected area establishment 2. Protected are category	C1, C2	11
Performance criteria and	1. Criteria and indicator for sustainable ecological function	C1, C2, C3	12 - 14

Topics	Sub-topics	Bloom's Taxonomy	Week
indicators of protected area management	2. Criteria and indicator for sustainable social cultural function 3. Criteria and indicator for sustainable economical function		
Case studies and Capita Selecta		C3, C4	15 & 16

Potential Course Overlap

There will be some overlap of topics from course Protected Areas Management (KSH 323)

Evaluation and Grading

1. Mid-term examination

Mid-term examination will be held during examination period scheduled by Registrar's office (after 7 weeks lecture). Length of exam is 120 minutes. The exam will cover course topics delivered in week 1-7.

2. Final examination

Final examination will be held during examination period scheduled by Registrar's office (after 7 weeks lecture). Length of exam is 120 minutes. The exam will cover course topics delivered in week 7-16.

Compositions of grading are as follows:

Assessment Tools	Maximum Score	% of Grade
Mid-term examination	100	45
Final examination	100	55

Final grade classification: A ($\geq$75); B (65-74); C (55-64); D (45-54); E (<45)

Coverage of DFORCE Core Competence

in Protected Area Planning (KSH 222)

Code : KSH 222

Course : Conservation Planning

Credit : 2(2-0)

Code	Core Competencies	Course Content Covered	Cognitive Level	Topic
I	Students will be able to correctly understand definition and scope of protected area planning within the context of regional development	Definition and scope	C1	Introduction
		Importance of protected area planning		
II	Students will be able to correctly understand protected area planning within the context of national policy	National development planning system	C1	Policy studies
		Regional planning		
		Forestry planning system		
III	Students will be able to understand the holistic theoretical bases for protected area, from ecological, social, cultural and economical aspects that are important in protected area planning	Bioregional/eco-regional approach	C1, C2	Theoretical bases & conceptual framework for protected area planning
		Island biogeography theory		
		Species evolution and formation		
		Traditional wisdom, tenurial and community access to natural resources		
		Protected area management policies		
		Common-Pool Resources		
		Position of protected area in regional development		
		Protected area management institution including governance		

Code	Core Competencies	Course Content Covered	Cognitive Level	Topic
IV	Students will be able to understand the ecological, cultural and economical benefits of protected area and biodiversity and their ecosystems within the context of regional development	Ecological benefits of protected areas	C2	Benefits of protected area in regional development
		Social cultural benefits of protected areas		
		Economical benefits of protected areas		
V	Students will be able to understand and apply the use of various tools in protected area planning	Problem and objective analysis	C2, C3	Planning tools for protected area
		Logical framework approach		
		SWOT analysis		
		Stakeholders Analysis		
		Interviews		
		Workshops and Focus Group Discussion		
		Need Assessment		
		Cost-Benefit Analysis		
VI	Students will be able to understand the meaning, criteria and indicators of protected area establishment and their application	Criteria for protected area establishment	C1, C2	Allocation and establishment of protected areas
		Protected are category		
VII	Students will be able to understand the meaning, criteria and indicators of protected area management performance and ways to formulate them	Criteria and indicators for sustainable ecological function of protected area	C1, C2, C3	Performance criteria and indicators of protected area management
		Criteria and indicators for sustainable social cultural functions of protected area		
		Criteria and indicators for sustainable economic function of protected area		
VIII	Students will be able to understand various case studies in protected area planning		C3, C4	Case studies and Capita Selecta

Assessment Tools to Measure the Achievement of
Learning Outcomes in Protected Area Planning (KSH 222)

Code : KSH 222

Course : Conservation Planning

Credit : 2(2-0)

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
I	Students will be able to correctly understand definition and scope of protected area planning within the context of regional development	Students will be able to correctly explain definition and scope of protected area planning within the context of regional development	C1	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
II	Students will be able to correctly understand protected area planning within the context of national policy	Students will be able to correctly explain protected area planning within the context of national policy	C1	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
III	Students will be able to understand the holistic theoretical bases for protected area, from ecological, social, cultural and economical aspects that are important in protected area planning	Students will be able to explain the holistic theoretical bases for protected area, from ecological, social, cultural and economical aspects that are important in protected area planning	C1, C2	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
IV	Students will be able to understand the ecological, cultural and economical benefits of protected area and biodiversity and their	Students will be able to explain the ecological, cultural and economical benefits of protected area and biodiversity and their ecosystems within the	C1, C2	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
	ecosystems within the context of regional development	context of regional development			
V	Students will be able to understand and apply the use of various tools in protected area planning	Students will be able to explain and apply the use of various tools in protected area planning	C2, C3	Written examinations at different cognitive level (mid-term and final exam).	Classroom lecture and discussion
VI	Students will be able to understand the meaning, criteria and indicators of protected area establishment and their application	Students will be able to explain the meaning, criteria and indicators of protected area establishment and their application	C1, C2	Written examinations at different cognitive level (final exam).	Classroom lecture and discussion
VII	Students will be able to understand the meaning, criteria and indicators of protected area management performance and ways to formulate them	Students will be able to explain the meaning, criteria and indicators of protected area management performance and ways to formulate them	C1, C2, C3	Written examinations at different cognitive level (final exam).	Classroom lecture and discussion
VIII	Students will be able to understand various case studies in protected area planning	Students will be able to understand various case studies in protected area planning	C3, C4	Written examinations at different cognitive level (final exam).	Classroom lecture and discussion